

## **Possible Science Fair Topic for Pre-AP Chemistry**

### **Project ideas**

#### **General:**

Design a new product

Test current consumer products

Build a scientific instrument

Build a useful devices or machine

Write code/ software for an app or device modification

Examine current scientific theories (prove, disprove, questions, etc.)

Repeat a famous experiment

#### **Chemistry:**

Which surface fertilizer's phosphates penetrate at the highest concentration to 3 feet?

How does fish tank temperature affect oxygen concentration?

Which type of attached water filter removes the most chlorine, lead, and sulfates?

How do natural pH indicators (rose leaf, cabbage, saffron) compare to broad spectrum pH paper in accuracy?

What are the most effective chemical ways to extract perfume oils from flowers?

Using potato catalysts, how does label concentration compare to actual concentration of Hydrogen Peroxide?

How the starting temperature does affects crystal growth and heat generation in a supersaturated sodium acetate solution—the solution used in hand warmers.

How does concentration of hydrogen peroxide effect rate of reaction in an iodine clock reaction?

How does varying the ratios of lip gloss mixtures effect the performance of homemade lip gloss?

Utilize various solvents to come up with the best separation mixture for use in paper chromatography to analyze the leaf pigments found in three different types of plants.

How do oxidizing agents compare when used to lighten or "bleach" human hair?

What effect does the pH of a water sample have on the testing for lead contamination?

How do the intensities and durations of light produced by glow sticks and other glow-in-the-dark materials compare when varying temperature.

How does current effect the rate of silver cleaning in electrical silver polishing?

### **Physics and Astronomy:**

Do the moon cycles affect things like crime rates, sleep patterns, or animal behavior?

Can spectroscopy be used to search for life on distant planets?

How do atmospheric conditions affect telescope operations?

How do different filters help determine temperature of distant stars?

Using Wien's formula to determine temperature, how does the temperature vary between different planets?

Using Snell's laws, how do different solutions differ in their index of refraction?

How do different chips or snacks vary in the average heat production (calculate calometric production)

How do various casted metals vary in their properties?

How can optics be used to increase solar energy production?

How does the size of Fresnel lenses affects its ability to produce heat?

Which shapes are useful for lower aerodynamic drag? (wings, paper airplanes)

How do casted metals differ in their electromagnetic resistance?

How do different household wires differ in their EM resistance?

How do the types of lenses in a telescope affect image quality?

How can sound waves be harnessed to produce usable energy (work)?

How do various adhesives differ in their effectiveness?

How do various lubricants vary in their effectiveness?

### **Environmental:**

How much sulfuric acid must be added to soil to lower the pH to 7?

How does the level of ground water in various locations in Arizona vary over time?

What combination of soil particulate has the best properties for leaching septic tanks?

How does the air quality differ within the city limits vs. in rural environments?

### **Energy and Transport**

What produces more energy per gram; fats or sugars?

How does varying the osmolarity of a solution affect water movement through a semipermeable membrane?

What type of coffee mug material (plastic, ceramic, metal, etc.) limits the most energy transfer over time?

Using normal bakers yeast, how is cellular metabolism affected by solution temperature as measured by cellular respiration?

Under a common landfill condition which biodegradable bag decomposes the most in 8 weeks?

Of three comparable rechargeable batteries, which will hold its charge under zero load the longest?

What's the maximum voltage /amps that can be obtained from a "lemon" battery?